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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/919,047
Filing Date: July 31, 2001
Appellant(s): NAGARAJAN ET AL.

John E. Curtin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 20 June 2007 appealing from the Office action mailed 7 November 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is generally correct, except that claim 6 should be included where the appellant states that the independent claims are claims 1, 9, 10, 11 and 17.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is deficient because the summary for independent claim 1 refers to the specification "paragraphs [22], [23], [27] and [29-33]". The content of the corresponding paragraph numbers in the specification does not represent claim 1. However, the portions of the specification referred to in the summary for

independent claims 6, 9 and 10, namely "page 3, line 34 to page 4, line 5; page 4, lines 31-33 and page 6, lines 14-19, for example", are representative of claim 1.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

- Wei et al.; "Just-in-time signaling for WDM optical burst switching networks"; Journal of Lightwave Technology, Vol. 18, Issue 12, Dec 2000, Pages 2019-2037.
- Qiao et al.; "Just-Enough-Time (JET): a high speed protocol for bursty traffic in optical networks"; Technologies for a Global Information Infrastructure, 1997 Digest of the IEEE/LEOS Summer Topical Meetings, 11-15 Aug. 1997, Pages 26-27.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 3-7, 9-15 and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by Wei et al. ("Just-in-time signaling for WDM optical burst switching networks"; Wei et al.; Journal of Lightwave Technology, Vol. 18, Issue 12, Dec 2000, Pages 2019-2037).

Regarding claim 1, Wei et al. disclose a method for use in a node of a network during a connection setup between a source node and a destination node, the method comprising the steps of: initiating a cross-connect with an adjacent node; at substantially the same time as the cross-connect is initiated, sending a connection setup message to a next node before the cross-connect is completed (fig. 4 and pages 2022-2024, section "D. Just-In-Time Optical Burst Switching" and fig. 5 and page 2028, col. 2, line 15 to page 2029, col. 1, line 28).

Regarding claim 3, Wei et al. disclose the method according to claim 1, wherein the network is an optical transport network (page 2019, Abstract).

Regarding claim 4, Wei et al. disclose the method according to claim 3, wherein the cross-connect is selected from the group consisting of an electrical-based cross-connect and a transparent wavelength-based optical cross-connect (page 2021, col. 1, lines 26-48).

Regarding claim 5, Wei et al. disclose the method according to claim 1, wherein the connection setup is a wavelength-based connection setup (page 2021, col. 1, lines 26-48).

Regarding claim 6, Wei et al. disclose a method for use in a node of a network during a connection setup between a source node and a destination node, the connection setup comprising a forward pass of signaling messages from the source node to the destination node and a reverse pass of signaling messages from the destination node to the source node, the method comprising the steps of: initiating a cross-connect with an adjacent node on the forward pass of the connection setup; at substantially the same time as the cross-connect is initiated, sending a connection setup message to a next node; and checking if the cross-connect was successful on the reverse pass of the connection setup (fig. 4 and pages 2022-2024, section "D.

Just-In-Time Optical Burst Switching" and fig. 5 and page 2028, col. 2, line 15 to page 2029, col. 1, line 28, where the SETUP signal reserves a wavelength and issues a command to the cross-connect fabric controller on the forward pass and the CONNECT signal, sent on the reverse pass, confirms that the cross-connect was successful).

Regarding claim 7, Wei et al. disclose the method according to claim 6, wherein the forward pass and reverse pass of signaling messages occurs out-of-band (page 2019, col. 2, lines 2-8).

Regarding claim 9, Wei et al. disclose a method for use in a node of a network during a connection setup between a source node and a destination node, the method comprising the steps of: sending a connection setup message to a next node at substantially the same time as a cross-connect is initiated; and performing the cross-connect with a downstream node prior to receipt of a signaling message related to a status of at least one cross-connect operation performed at another downstream node (fig. 4 and pages 2022-2024, section "D. Just-In-Time Optical Burst Switching" and fig. 5 and page 2028, col. 2, line 15 to page 2029, col. 1, line 28).

Regarding claim 10, Wei et al. disclose a method for use in a node of a network during a connection setup between a source node and a destination node, the method comprising the steps of: sending a connection setup message to a next node from an upstream node at substantially the same time as a cross-connect is initiated; and responsive to the received connection setup message, executing a cross-connect with a downstream node (fig. 4 and pages 2022-2024, section "D. Just-In-Time Optical Burst Switching" and fig. 5 and page 2028, col. 2, line 15 to page 2029, col. 1, line 28).

Regarding claim 11, Wei et al. disclose apparatus comprising: a communications interface for providing signaling to a downstream node and for receiving signaling from an upstream node; and a processor, responsive to receipt of a connection setup message sent

from the upstream node at substantially the same time as a cross-connect is initiated (fig. 4 and pages 2022-2024, section "D. Just-In-Time Optical Burst Switching" and fig. 5 and page 2028, col. 2, line 15 to page 2029, col. 1, line 28, where the JIT signaling agent is a processor)

Regarding claim 12, Wei et al. disclose the apparatus according to claim 11, wherein the upstream node and the downstream node are in an optical transport network (page 2019, Abstract).

Regarding claim 13, Wei et al. disclose the apparatus according to claim 12, wherein the cross-connect is selected from the group consisting of an electrical-based cross-connect and a transparent wavelength-based optical cross-connect (page 2021, col. 1, lines 26-48).

Regarding claim 14, Wei et al. disclose the apparatus according to claim 11, wherein the connection setup is a wavelength-based connection setup (page 2021, col. 1, lines 26-48).

Regarding claim 15, Wei et al. disclose the apparatus according to claim 11, wherein the signaling occurs out-of-band (page 2019, col. 2, lines 2-8).

Regarding claim 17, Wei et al. disclose apparatus comprising: a communications interface for receiving signaling sent from an upstream node at substantially the same time as a cross-connect in initiated, at the upstream node on a forward pass of a connection setup and receiving signaling from a downstream node on a reverse pass of the connection setup; and a processor for initiating a cross-connect with the downstream node on the forward pass, and for checking if the cross-connect was successful on the reverse pass (page 2028, col. 2, line 15 to page 2029, col. 1, line 28), where the JIT signaling agent is a processor, and where the SETUP signal initiates a cross-connect on the forward pass and the CONNECT signal, sent on the reverse pass, confirms the cross-connect was successful.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wei et al. ("Just-in-time signaling for WDM optical burst switching networks"; Wei et al.; Journal of Lightwave Technology, Vol. 18, Issue 12, Dec 2000, Pages 2019-2037) in view of Qiao et al. ("Just-Enough-Time (JET): a high speed protocol for bursty traffic in optical networks"; Qiao et al.; Technologies for a Global Information Infrastructure, 1997 Digest of the IEEE/LEOS Summer Topical Meetings, 11-15 Aug. 1997, Pages 26-27).

Regarding claims 8 and 16, Wei et al. disclose the method and apparatus according to claims 6 and 16, respectively, and disclose forward pass and reverse pass of signaling (page 2028, col. 2, line 15 to page 2029, col. 1, line 28). Wei et al. also discuss in-band signaling (page 2021, col. 2, lines 11-17 and page 2022, col. 1, lines 9-21), but do not elaborate on in-band signaling in their example of JIT signaling. Qiao et al. disclose an implementation of JIT signaling using in-band signaling (page 26, section 2, where the Qiao et al. system is not a WDM system and thus the signaling is inherently in-band, i.e. in the same wavelength). It would have been obvious to one of ordinary skill in the art at the time of the invention that the JIT system of Wei et al. could alternately function using in-band signaling, as taught by Qiao et al., in order to provide packet-switching-like JIT signaling, with the traffic burst durations and optical buffers optimally matched to avoid dropped bursts, to provide the advantage of the short setup

time achievable when the control information travels on the same wavelength as the data (i.e. the signaling for one path not requiring setup time for multiple wavelengths).

(10) Response to Argument

In the appeal brief, **section VII.A**, starting on page 5, the appellant presents the main arguments against anticipation of claims 1, 3-7, 9-15 and 17 by Wei. Generally, as stated in lines 6-10, the appellant argues that the claims recite "sending a connection setup message to a next node at *substantially the same time as a cross-connect is initiated*", and that in contrast, "Wei appears to send a SETUP message after a cross-connect is initiated" [emphasis appellant's]. Overall, the appellant's arguments hinge on referring to the entire time period covered by Wei's two adjacent time periods t_p and t_c, equating the start of this entire time period (i.e. the start of t_p) with the claimed "initiating a cross-connect", and then arguing that since Wei sends out a connection setup message ("SETUP message") to a next node at the point in time between periods t_p and t_c (i.e. half-way through the entire time period, instead of at the start), that Wei does not disclose sending a SETUP message to a next node at substantially the same time that the cross-connected is initiated. However, the appellant's arguments are not persuasive because the meaning of "initiating a cross-connect" in the claims, in light of the specification, is not consistent with its meaning in the appellant's arguments, and is read on by what happens at the start at Wei's time period t_c, not what starts at t_p.

First, as an aside, in the brief, page 5 lines 11-14, the appellant states that the Examiner appears to take the position in the Final Office Action that the time period t_p in Wei is unrelated to a cross-connect. However, the Examiner explained on page 6 of the Final Office Action that cross-connect **initiation** in Wei is associated with period t_c. The Examiner did **not** say that period t_p is summarily unrelated to a cross-connect.

Next, in the brief, page 5 line 15 to page 6 line 4, the appellant interprets fig. 4 of Wei and argues that Wei's time period t_p is depicted as being part of the "cross-connection setup process" [appellant's wording], and since the SETUP message is sent to the next node after time t_p has elapsed, Wei therefore does not disclose sending a SETUP message to a next node at substantially the same time that a cross-connect is initiated. The appellant does recognize that Wei's cross-connect is "cut-through" starting at time period t_c. This raises the question: what does "initiating a cross-connect" mean in the claims?

The specification, page 5 lines 13-25, describes what happens at, for example, an intermediate node. The chronology of events is as follows: 1) an intermediate node receives a connection setup message; 2) the intermediate node checks the possibility of executing a cross-connect; 3a) if it is not possible to execute the cross-connect, the intermediate node sends a failure message to the upstream node (a node that is closer to the source node, than the current node); 3b) if the cross-connect is possible, the intermediate node starts a timer; 4) after the timer is started the intermediate node initiates the cross-connect; 5) after the cross-connect is initiated, the intermediate node sends a connection setup message to the downstream node (a node that is closer to the destination node, than the current node); and 6) after the connection setup message is sent, the intermediate node checks if the local cross-connect was successfully completed. Also, the specification, page 6 lines 17-20, states that events 4 and 5 above happen at the same time. Further, the specification, page 5 line 33 to page 6 line 1, describes "actual activation of the cross-connects" as a different activity from "soft reservation of connection resources". Therefore, what the claims mean by "initiating a cross-connect" is the actual activation of the cross-connect in hardware, which happens after the setup processing (i.e., setup events 1 to 3). Therefore, the appellant's argument, equating the start of Wei time period t_p, with "initiating a cross-connect", is inconsistent with what "initiating a cross-connect"

means in the claims. "Initiating a cross-connect" in the claims means the actual activation of the cross-connect in hardware that happens after setup processing.

In Wei fig. 4, the time axis flows from top to bottom of the figure and the space/distance axis flows from left to right. In this figure, the SETUP message starts propagating toward the next node after period t_p, at approximately the same time that period t_c starts. On page 2025, col. 1, Wei further defines t_p as "protocol messaging processing time" and t_c as "crossconnect cut-through switching and stabilization time". Thus, the SETUP message starts propagating toward the next node at the same time that cross-connect cut-through switching and stabilization initiates. The cross-connect cut-through switching is the actual activation of the cross-connect in hardware. Therefore, Wei anticipates the claimed "initiating a cross-connect" and "at substantially the same time as the cross-connect is initiated, sending a connection setup message to a next node", as described in the rejections above.

Next, in the brief, page 6, lines 5-18, the appellant refers to page 6 the Final Office Action where the Examiner noted a passage where Wei's uses the word "setup". The passage is, "cross-connect setup is performed in parallel with the next hop propagation" (Wei: page 2023, col. 2). The appellant essentially repeats the same argument, saying that Wei is sending the SETUP message to the next node sometime during the entire cross-connect setup period, but not at the beginning of the entire period described above (i.e. not at the start of time period t_p). This argument is not persuasive for the reasons described above. Further, what the appellant means by the entire "setup" time period in Wei (i.e. t_p plus t_c) is not what Wei means by "setup" on page 2023; the Examiner also noted on page 6 of the Final Office Action that Wei defines t_p as "protocol messaging processing time" and t_c as "cross-connect cut-through switching and stabilization time" (Wei: page 2025, col. 1). Considering this definition for t_c, and that Wei's page 2023 "setup" is performed in parallel with next hop propagation, and that fig. 4

of Wei reveals that t_c occurs in parallel with next hop propagation, it's clear that the term "setup" on Wei's page 2023 corresponds to "cross-connect cut-through switching and stabilization time" (time period t_c), and not to time period t_p or to the sum of time periods t_p and t_c.

Next, in the brief, page 6 lines 19-27, the appellant cites page 2029 of Wei, which says "the WDM switch reserves the wavelength on the output port, proceeds to make the actual cross-connect by issuing a command to the fabric controller, and forward the SETUP message to the next hop". The appellant concludes from this passage that Wei's cross-connect is substantially completed before the SETUP message is forwarded to the next node. This argument is not persuasive because *proceeding to make* the actual cross-connect by *issuing a command* to the fabric controller is not the same as completing the cross-connect *in the fabric* (i.e. in hardware). To the contrary, t_c is defined as "cross-connect cut-through switching and stabilization time". The cross-connect is only finally completed in the fabric/hardware after it has stabilized at the end of time period t_c. And from fig. 4 it's clear that by end of time period t_c, the SETUP message is well on its way to the next node, if it's not already at the next node.

In the appeal brief, **section VII.B**, starting on page 7, the appellant presents the arguments against the rejections of claims 8 and 16 (unpatentable over Wei in view of Qiao).

First, in the brief, page 7, lines 14-21, the applicant argues that Wei appears to be directed solely at out-of-band signaling. While Wei's main embodiment is directed at out-of-band signaling (as is all of the applicant's disclosure except for the last sentence), Wei as a whole prior art reference is not "solely" directed at out-of-band signaling. In fact, the appellant acknowledges as much, stating that Wei mentions a generalized form of in-band signaling (see Wei: page 2021, col. 2, lines 11-17 and page 2022, col. 1, lines 9-21), but states that Wei does not make use of it. The 35 USC § 103 rejections don't rely on Wei's main embodiment using in-band signaling (otherwise, Qiao would be unnecessary). However, the generalized form of in-

band signaling mentioned by Wei is in fact relevant in the combination; Wei is prior art for all that it teaches. The 35 USC § 103 rejections rely partially on Wei's disclosure of what in-band and out-of-band signaling are in optical communications. Wei states that for in-band signaling, control information travels along with the data. What does this mean exactly? Traveling along how? Well, since Wei is talking about optical communications, he means traveling along on the same *wavelength*. The alternative to in-band signaling is out-of-band signaling. Wei says "the alternative [to in-band] is to transmit control information independent of the data-burst on a separate signaling channel". In other words, out-of-band means traveling along on separate wavelengths. This contribution of Wei is relevant in combination with Qiao, as will be seen below in response to the appellant's further arguments.

Next, in the brief, page 7 line 22 to page 8 line 2, the appellant argues that the combination doesn't disclose the claimed in-banding signaling because Qiao doesn't disclose in-band signaling. Specifically, while the appellant acknowledges that Qiao page 26 section 2 discloses that "a data burst follows the control packet after an offset time, T", the appellant argues that the word "after" in the text of Qiao "relates to time, not the same channel". This argument is not persuasive. The word "after" always refers to time, that is not the issue. The issue is as follows. Since Qiao is talking about optical communications, the control packet and data burst are each inherently at some optical wavelength; the question is, are they on the same wavelength or on different wavelengths? Based on the context that Wei provides, i.e. what optical in-band and out-of-band signaling are (and that they are alternatives), Qiao's data burst would have to be on a different wavelength from the control packet if it is out-of-band signaling; otherwise, it's on the same wavelength and thus in-band. Qiao discloses the control packet and data burst as separate *in time*, not separate in wavelength. Out-of-band signaling requires

separation in wavelength. Therefore, Qiao's data burst has to be following the control packet on the same wavelength, and is thus in-band.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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